Pennsylvania Avenue Bridge
Spanning Rock Creek and Potomac Parkway
Washington
District of Columbia

HAER No. DC-21

PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
U.S. Department of the Interior
Washington, DC 20013-7127

HISTORIC AMERICAN ENGINEERING RECORD
PENNSYLVANIA AVENUE BRIDGE
HAER No. DC-21

Location: Pennsylvania Avenue Bridge spans Rock Creek and Potomac Parkway and Rock Creek, and connects Georgetown to Washington, D.C.

Date of Construction: 1858-60; 1915-16.

Designer and Builder: Water-main pipes, the work of the Phoenix Iron Company of Philadelphia, survive from the bridge designed by Gen. Montgomery C. Meigs; they are enclosed within the 1915-16 bridge designed by the D.C. Bridge Division and constructed by Hardaway Construction Company of Columbus, Georgia.

Present Owner: Department of Public Works, District of Columbia.

Present Use: Vehicular and pedestrian bridge; aqueduct.

Significance: Cast-iron water mains from the Aqueduct Bridge by Montgomery Meigs, the span that preceeded the present bridge, are encased in the concrete arch and are visible on the underside. These pipes were integral to the city's early water supply, and they continue to function as a link in the system that carries water from the reservoir in Georgetown to the city of Washington proper. The 1915-16 concrete arch span elicited a complaint from the Commission of Fine Arts about its design, and initiated the debate about the proper form of Rock Creek crossings.

Project Information: The documentation of Rock Creek and Potomac Parkway was undertaken as a two-year pilot project to help establish standards and guidelines for recording the structures and landscape features of park roads and parkways. This project was a joint effort of the Historic American Buildings Survey and the Historic American Engineering Record (HABS/HAER), a combined division of the National Park Service, Robert Kapsch, chief. The project was sponsored by the Park Roads Program of the National Park Service, John Gingles, deputy chief, Safety Services Division. The project supervisor was Sara Amy Leach, HABS historian.

The Washington-based summer 1992 documentation team was headed by landscape architect Robert Harvey (Iowa State University-Department of Landscape Architecture) who served as field supervisor; the landscape architects were Deborah Warshaw (University of Virginia) and Dorota Pape-Siliwonczuk (US/ICOMOS-Poland, Board of Historical Palaces and Gardens Restoration); the architects were Evan Miller (University of Colorado-Boulder), Steven Nose (University of Maryland), and Tony Arcaro (Catholic University). The historians were Tim Davis (University of Texas) and Amy Ross (University of Virginia). Jack E. Boucher made the large-format photographs; Air Survey Corporation of Sterling, Virginia, produced the aerial photography and digital mapping from which the site-plan delineations were made.

History of the Crossing

Twenty years before the first Pennsylvania Avenue Bridge was erected, a proposal was presented for a span at this site. In 1836, an appropriation of $20,000 was sought from Congress for a substantial stone bridge over Rock Creek on axis with Pennsylvania Avenue. This bridge, crossing to Georgetown, was justified as a convenience for members of every department of the federal government. The same appropriation called for funding street improvements, especially to Pennsylvania Avenue and streets in the vicinity of the Capitol.[1]

A stone bridge across Rock Creek at this location was proposed again in 1841. That year J. J. Abert, chief of topographical engineers, reported on plans and estimates for such a crossing. He noted that Pennsylvania Avenue currently deflects to take advantage of the existing bridge across Rock Creek, which connected High Street in Georgetown and M Street in Washington. The engineer suggested opening Pennsylvania Avenue directly to the creek, and erecting a new bridge there to connect this avenue with High Street on the west side of the creek. The estimate for a stone bridge was $40,000, and for the connection between the bridge and High Street in Georgetown, $2,000. However, Abert recommended an iron structure. He wrote: "The abutments should, of course, be of stone; but if the superstructure were to be of iron, it would admit of a more beautiful bridge, equally durable, and at rather less cost."[2] Ultimately both projects were rejected.

Meigs' Bridge

A crossing at this site was finally begun in 1858. It was designed and construction supervised by Gen. Montgomery Meigs. He originally designed the structure as part of the aqueduct carrying the city water supply, with its sole purpose being the transport of water across the creek. However, the urgent need for vehicles to traverse this route during the Civil War--just when the aqueduct was finished--spurred the Army Corps of Engineers to decide that this crossing be outfitted as a bridge.

Meigs' bridge had two large, cast-iron pipes that arched 200'. It was the only cast-iron bridge of considerable size in the United States at the time of completion in 1860; the only previous all-iron example was Dunlaps Creek Bridge (1836) in Pennsylvania, a significantly smaller arch.

Meigs, in his role as engineer in charge of the Washington Aqueduct, reported in late 1859 on the progress of the system. On the erection of the span at Pennsylvania Avenue, Meigs commented:

> The construction of the abutments of the bridge over Rock Creek was arrested by the exhaustion of the appropriation in June. They had been raised high enough to resist the thrust of the arch and, as the contractor for the iron work had been paid the cost of the materials of the bridge, the greater part of which he had fitted ready to put up, he has upon his own responsibility and without pay, gone on to complete his work. The arch is in place, has been filled with water, and tested, and performs satisfactorily. It is a cast-iron arch of 200' span, made of two lines of 48" pipes which convey the water across the creek and also support a roadway for travel. The greater part of the pumping main leading to the High Service Reservoir has been laid. The pumping engine is in place in the west abutment of the Rock Creek bridge.[3]

He requested funds to complete the work: $12,000 for "iron and wood-work of Bridge across Rock

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[1] U.S. House, Improvement Pennsylvania Avenue Over Rock Creek... (24th Cong., 1st sess., 1836, H. Rpt. 604). (Serial Set 295).

[2] U.S. Senate, Message from the President of the United States (26th Cong., 2nd sess., 1841, S.doc. 51). (Serial Set 376).

[3] Gen. Montgomery C. Meigs. Annual Report of Operations upon the Washington Aqueduct for the year ending 30th September, 1859. RG77.

Creek" and $17,000 for masonry.[4]

Aqueduct Bridge was not yet completed in February 1860. However, by this time the water main it carried was in operation. The Report of the Water Board of Georgetown, D.C., published at this time, noted: "The water-pressure engine in the west abutment of the Rock Creek iron bridge supplies all that portion of the city of Georgetown, which is over 100' above tide. The engine works satisfactorily, having now been in operation day and night since the 10th of December. Thus far, working at one-eighth speed only, it has supplied all the water used in that part of the city."[5]

A contemporary description of this structure appeared in the September 1860 issue of Harper's Weekly. The article read:

> This bridge is a cast-iron arch of 20' rise and 200' clear span between tbe abutments. The arch consists of two ribs, each of which is composed of seventeen cast-iron pipes of 48" internal diameter, and 12'-3" in length. Upon these two arched ribs, whicb are firmly connected with eacb other by cast-iron tubular cross braces and heavy wrought-iron diagonal ties, is erected a frame-work of beavy rolled iron H-beams, from the works of tbe Phoenix Iron Company of Philadelpbia, supporting two continuous horizontal iron girders, of 204'-6" in length. Upon tbese girders rest cross beams of timber, supporting tbe roadway of the bridge, which embraces two city railroad and carriage tracks, and two paths for foot-passengers.[6]

The water-pressure engine, contained within the western abutment that served as an engine-room, was considered "the first, it is believed, erected in this country."[7]

The arch ribs of this bridge--functioning as water mains--were placed 18' on center and held in place by cast-iron struts and wrought-iron rod bracing. The struts between arch voussoirs and top chord formed a web system of support. To prevent freezing the pipes were lined with staves of resinous pine timber 3" thick, which left a clear waterway of 3-1/2' in diameter in each rib.[8]

On January 24, 1862, this bridge was named for Gen. Meigs through a resolution adopted by the Board of Aldermen of the city of Washington.[9] It completed the line of a ceremonial artery, Pennsylvania Avenue, which runs from the Capitol to the White House--symbolically and physically connecting these two branches of the federal government. This had been a significant route since the founding of the city, but had not previously extended directly to Georgetown.

In 1863, the track of Washington's first horse-drawn street railway was placed on this bridge.[10] In 1872, the streetcar line was rerouted across the newly built M Street Bridge--its steel

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[4] Meigs.

[5] Georgetown Water Works, Report of the Water Board of Georgetown, D.C., 10 February 1860 (Washington, D.C., 1860). RG77. This information comes from an article in the National Intelligencer that was added as supplement to report.

[6] "The Washington Aqueduct Bridge," Harper's Weekly 4 (29 September 1860): 610.

[7] "The Washington Aqueduct Bridge," 610.

[8] "The Washington Aqueduct Bridge," 610.

[9] "When Washington Was Younger-- No. 164," Washington Post, [1932?].

[10] Llewellyn Nathaniel Edwards, A Record of History and Evolution of Early American Bridges (Orono, ME: University Press, 1959), 76-77.

truss and width being more suited to horse-drawn streetcars than the narrow bridge at Pennsylvania Avenue, which had a clear width of only 17'.[11]

Design History

The Commission of Fine Arts (CFA), established in 1910 to advise the government on artistic matters, led the call for bridges erected in the Rock Creek Valley to be of an architectural character befitting their park setting. Connecticut Avenue Bridge (1897-1907), which had set a high standard for aesthetic quality, was cited as the model for parkway-bridge design.[12]

In November 1913, the commissioners of the District of Columbia requested permission from the CFA to build an arched bridge at Pennsylvania Avenue, rather than the girder design that had previously been approved. The commissioners noted, "The design of the arch bridge places the bridge at the site of the present bridge upon a rock foundation." Whereas the alternative, a girder design, would have to be built on new foundations east of the existing bridge and would require new water mains. Thus, the cost of the girder, including removal and replacement of the water mains, would be $180,000--$20,000 more than the appropriation. The arch-bridge design would be supported by reinforced concrete ribs, between which the existing 48" water mains could remain. This bridge would cost $160,000. Citing these facts, the District Commissioners solicited the opinion of the CFA. They sent blueprints of the two proposals--an arch and a girder design--and requested they make a recommendation.[13]

The CFA opposed the arch scheme and suggested that an architect of recognized ability be employed to assist with the design of this and all bridges built over the parkway in the future. The advice of the CFA was ignored, however, and the concrete arch was begun. In 1916, Col. William W. Harts recorded the CFA's dissatisfaction with the new bridge:

> The provision made by Congress for a physical connection between Potomac and Rock Creek parks has brought out many considerations as to routes and land-takings, in order to secure the most sightly parkway without undue expense. When this improvement shall be accomplished the lower portion of the valley of Rock Creek will be converted from a region of squalor to one of positive beauty. Connected intimately with this development is the character of bridges crossing Rock Creek. The Commission [of Fine Arts] advised that the architectural possibilities of the Pennsylvania Avenue bridge be considered in connection with the proposed improvements of the Rock Creek Valley. This advice was not followed and as a result this particular bridge is out of harmony with the Q Street Bridge with which it comes in contrast . . . Connecticut Avenue Bridge should set the standard of quality and effect, although of course designs must and should vary.[14]

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[11] Zack Spratt, "Rock Creek's Bridges," Records of the Columbia Historical Society 53-56 (1959): 132.

[12] Col. William H. Harts, Memo extracting from the last Annual Report of the Commissioners of the District of Columbia, 5 January 1916. RG66.

[13] Commissioners of the District of Columbia to the Commission of Fine Arts, 13 November 1913. RG66.

[14] Col. William W. Harts.

The design was rebuked by the CFA for its simplicity.[15] Thus, the new Pennsylvania Avenue Bridge sparked debate, which raged for years, over the appropriate appearance for Rock Creek crossings.

Description

Since 1860, the Pennsylvania Avenue Bridge has served a dual purpose--as a vehicular bridge and an aqueduct. Its concrete arch encloses two large water mains, begun in 1858 as an extension of the aqueduct system supplying the city of Washington. Though concealed, these pipes remain intact.

The rebuilt bridge was designed of reinforced concrete to carry a heavier traffic load. Reinforcing bars embedded in the concrete are visible on the undersurface of the bridge. In addition to the mains, a portion of the old sandstone abutment is enclosed within the present bridge. The present concrete bridge is much wider than its predecessor. Completed in 1916, the bridge is 276' long, 40' high, and 73' wide. The roadway is 50' wide, the sidewalks are 10'.[16] The cost was $121,032.[17]

The structure has a smooth granite facing. The balustrade, which has shallow relief moldings that give it a classical look, cantilevers out from the deck.

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[15] "Design of Bridge Over Rock Creek Criticized," Washington Herald, 26 December 1915.

[16] Department of Highways, Washington, D. C., A Pictorial Report on Highway Bridges and Structures in the District of Columbia (Washington, D. C.: Department of Highways, 1948), 38.

[17] Department of Highways, 37.

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ADDENDUM TO:
PENNSYLVANIA AVENUE BRIDGE
Rock Creek Park
Rock Creek & Potomac Parkway Project
Spanning Rock Creek & Potomac Pkwy.
Washington
District of Columbia County
District of Columbia

HAER No. DC-21

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PHOTOGRAPHS

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